

REMARKS

None of references cited show all of the features of independent claim 1; namely, a peristaltic hose pump of the type having a shaft and comprising several eccentric discs each of which carries a bearing and thus moves a pump finger transversely to a pump hose, and with a sealing diaphragm disposed between the shaft and the pump hose, and wherein each of the bearings is connected with a connecting rod which engages on a linearly guided pump finger, the pump fingers are arranged at the side of the sealing diaphragm facing the pump hose, and the connecting rods pass through the sealing diaphragm.

None of references cited show all of the features of independent claim 12; namely, a peristaltic hose pump for moving fluid through a pump hose, the peristaltic hose pump comprising a rotatable shaft, several eccentric discs connected to the shaft for rotation therewith, a bearing carried by each eccentric disc, several linearly guided pump fingers corresponding to each bearing, a connecting rod, connected between each pump finger and each bearing, so that the pump finger is moved transversely to a pump hose upon rotation of the shaft, a sealing diaphragm disposed between the shaft and the pump hose, wherein the connecting rods sealingly pass through the sealing diaphragm and the pump fingers are arranged at one side of the sealing diaphragm facing the pump hose and the bearings are at the other side of the sealing diaphragm facing the rotatable shaft.

The references do not make the claimed invention obvious, either taken alone or in any combination that is suggested by the prior art.

The Heminway et al. (US 4,893,991) reference cited in the application discloses a peristaltic hose pump with a shaft and mounted eccentric discs which move pump fingers transversely to a pump hose (US 4,893,991 Fig. 1). In this reference the pump fingers are only in contact with the eccentric discs. There are no bearings carried by eccentric disc wherein each of the bearings is connected with a connecting rod which engages on a linearly guided pump finger, as in the combination claimed in claim 1. There are no bearings carried by each eccentric disc, several linearly guided pump fingers corresponding to each bearing, and a connecting rod, connected between each pump finger and each bearing as in the combination in claim 12. In Hemingway for example, each pump finger has a compression spring 32 to urge the pump fingers away from the pump hose and into sliding contact with each eccentric disc, or with each bearing, as the case may be. As another example of differences, the Hemingway et al. reference

does not disclose or suggest a sealing diaphragm for peristaltic hose pumps with pump fingers. As a further example, the reference does not show or suggest a sealing diaphragm facing the pump hose and connecting rods passing through the sealing diaphragm.

The elements missing from Hemingway are not supplied or suggested by the European application (EP 0 214 443 A1 = European Patent Application 861105120). The European application discloses a rotary transfusion pump with a shaft and mounted eccentric discs which move pump elements transversely to a pump hose. In the European application the pumping fingers contact the eccentric discs, but are engaged by a rod connected to a bearing carried by the eccentric disc, as in the combination as claimed. Note that the claimed structure allows the eccentric disc to push and pull the pumping finger. In EP 0214,443, for example, the pumping fingers are in sliding contact with the eccentric discs in Fig 2 and "the finger plate 52 is pushed back toward the rotary shaft 58 when the tube is restored by fluid filled therein." Alternatively, in Fig. 4 the fingers 52 are in contact with bearings 68 carried by eccentric discs. The bearings in EP 0214,443 are not connected with connecting rods which engage on a linearly guided pumping finger as in claim 1. The bearings in EP 0214,443 are not connected with connecting rods connecting between the bearing and the pumping fingers as in claim 12.

The elements missing from Hemingway are not supplied or suggested by Borsanyi (US 4,482,347). The Borsanyi patent discloses a peristaltic fluid pumping apparatus without any pump fingers. A sealing diaphragm is shown directly between the pump hose and the eccentric discs with mounted ball bearings (Borsanyi Figs. 6-10; EP 0 214 443 A1 Figs. 7 + 8). There is no suggestion of using a diaphragm with pumping fingers, as there are no pumping fingers. Moreover, there is no showing of how a diaphragm might be combined with pumping fingers.

If one were to combine the diaphragm of Borsanyi with the pump of Heminway then such a diaphragm would also be directly situated between the pump hose and the pump fingers. There is no teaching and no suggestion of having every connecting rod pass through a diaphragm in a peristaltic hose pump according to the claimed invention.

EP 0 214 433 A1 discloses both pumps with pump fingers and a rotary pump without any pump fingers whereby the disadvantages of the rotary pump without any pump fingers are described in detail including the necessity of having to have a sealing diaphragm. The described pumps with pumping fingers described in EP 0 214 433 A1, in the case of a pump without pump fingers, a sealing diaphragm is showing between the pump hose and the eccentric

discs with mounted ball bearings (EP 0 214 433 A1) do not have any sealing diaphragm and one can infer from the specification that this simplification of the design is considered to be advantageous. It would therefore not be obvious to combine such a sealing diaphragm with a pump with pump fingers.

If one were to combine the diaphragm of EP 0 214 433 A1 with the pump of Heminway then such a diaphragm would also be directly situated between the pump hose and the pump fingers. There is no teaching and no suggestion of having every connecting rod pass through a diaphragm in a peristaltic hose pump according to the claimed invention.

The membrane pump shown in von der Heyde (US 5,533,886) is not a peristaltic hose pump with pump fingers and does not disclose any hose tubing at all. The second membrane 39 shown in the van der Heyde reference acts as a safety membrane for the pump membrane 3. It is respectfully submitted that this pump is too different from the peristaltic hose pump with pumping fingers to be considered relevant or to suggest any combination with the type of pump as claimed by applicants.

Robinson (US 6,036,459) shows a rotary peristaltic pump and does not show a peristaltic pump with pumping fingers as in the claimed invention. It is respectfully submitted that this pump is too different from the peristaltic hose pump with pumping fingers to be considered relevant or to suggest any combination with the type of pump as claimed by applicants. Among other differences, Robinson also does not show a diaphragm through which connecting rods pass as claimed, rather it shows separate fluid filled bellows 168 that contain a fixed amount of fluid and so that the contained fluid acts to provide a regulated force on the rotating radial pumping rollers that roll along the tubing 140. The bellows 168 prevents fluid 155 from escaping from a constant pressure fluid chamber 160 and the bellows are not in any way meant to prevent pumped liquid in the pump hose 140 from entering the pump housing 10.

As neither of the membranes of von der Heyde or Robinson are meant to prevent leakage from hose tubing and are quite different in construction to peristaltic hose pumps having pumping fingers, it would not be obvious to combine either of such membranes with Hemingway to obtain the pump as disclosed and claimed in the present application.

In the peristaltic hose pump according to the invention each bearing 22 is connected to a connecting rod 25 which in turn engages on a linearly guided pump finger 11 by way of a joint 26. The connecting rod structure makes it possible to guide the pump finger 11 linearly and to also be able to automatically retract it from the pump hose as it is moved together

with the movement of the eccentric disc 21. This was not possible with the combination of known eccentric discs and pump fingers (Heminway and EP 0 214 443 A1 – Figs. 1+2). The utilization of pump fingers also makes it possible to place the sealing diaphragm between the pump fingers and the bearings, which may be considered better in certain embodiments than placing it directly between the eccentric disc and the pump hose as in Borsanyi and EP 0 214 443 A1 – Figs. 7+8). In the claimed combination structure, the connecting rods pass through the sealing diaphragm between the pump fingers and the bearings.

Among other differences observed in the claims of the present application, none of the cited references show the combination as claimed. For example, none show a peristaltic hose pump with linearly guided pump fingers and eccentric discs which each carry a bearing and are connected via the outer ring of the bearing to a connecting rod which engages on each pump finger. In addition none of the cited references show a sealing diaphragm that is not placed directly between the pump finger and the pump hose.

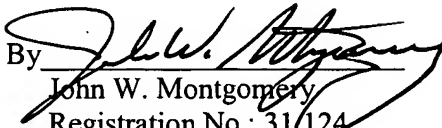
The references Von der Heyde, Robinson and Borsanyi all do not show peristaltic hose pumps with linearly guided pump fingers and eccentric discs and for the reasons already stated above are deemed too different to be combined with any cited reference that does show a peristaltic hose pump with linearly guided pump fingers and eccentric discs, (EP 0 214 443 A1 and Heminway).

For all of the forgoing reasons it is deemed that the invention as claimed is patentable over the references cited and is believed to be in a condition for allowance. Please reconsider the application in view of the above amendment remarks. Applicant thanks the Examiner for carefully considering this application and respectfully request that the rejections be withdrawn and that the application be passed to issue.

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Applicant believes no fee is due with this response. However, if a fee is due, or if an over payment has been made, please charge any charges not covered, or apply any credits, to Deposit Account 50-0591 (Reference Number 17128/003001), from which the undersigned is authorized to draw.

Dated:

Respectfully submitted,

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